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10 July 1981

East Europe Report

SCIENTIFIC AFFAIRS

No. 708

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CEMA COMPUTER TECHNOLOGY SPECIALIZATION, COOPERATION DISCUSSED

East Berlin RECHENTECHNIK-DATENVERARBEITUNG in German Vol 17 No 9, Sep 80 pp 5-6

[Article by Dr Helmut Peiper, State Planning Commission: "Main Features of Further Cooperation in ESER--Multilateral Specialization Agreement on Electronic Computer Technology Signed"]

[Text] On the occasion of the 34th meeting of the Council for Mutual Economic Assistance in June 1980 in Prague, a series of important documents pertaining to the further cooperation of member countries was released. This action once again showed how the socialist countries, on the foundation of socialist economic integration, are resolutely pursuing their stable course for further expansion of socialist society in spite of changed conditions in world markets.

One of these documents is the agreement concerning multilateral international specialization and cooperation in the development and production of computer technology for mutual exchange. It was signed at the level of the representatives of the governments of the member countries, thereby indicating its great importance for the economies represented.

As is known, Bulgaria, Hungary, the GDR, Poland, USSR and CSSR have been working together very closely since 1969 on the basis of a multilateral governmental agreement in the development, production and application of electronic data processing equipment. Romania and Cuba entered the agreement during the course of the cooperative effort.

The results of this cooperative effort were presented in June 1979 in an impressive exhibition in Moscow which was opened on the occasion of the 20th meeting of the Multilateral Governmental Commission, the highest panel for the realization of the agreement. After 10 years of successful cooperative effort, the following progress was reported:

--In the participating countries about 500,000 workers are employed in the field of electronic computer technology,

--In the area of universal computers, significant progress toward technical perfection was successfully accomplished with the ESER Series II,

--Thanks to the introduction of the system of small computers in the work of the Multilateral Governmental Commission, further important foundations were laid for the broad development and production of high-quality electronic computer technology.

All participating countries presented solutions to applications problems. The developments demonstrated in Moscow are being successfully pursued.

With the signing of the Multilateral Specialization Agreement in Prague on the occasion of the 34th CEMA Congress, a further high point was established in the cooperative effort between socialist countries in the area of electronic computers. This high point serves both as a summation of what has been achieved and as a baseline for further work.

It is a summation of achievement in the sense that with the multilateral agreement the basic paths of specialization were prescribed. They represent in total a complete system--as required for the conditions of scientific-engineering development--for the application of electronic data processing. This system is internally compatible and provides appropriate interfaces for peripheral equipment which at present is still produced under bilateral agreements between the countries.

The agreement is the baseline for further work to the extent that the baselines for the further cooperative effort of the countries involved in development and production are laid out along with the basic directions of specialization. With these baselines the opportunity is purposely provided for undertaking the definition and expansion necessary for scientific and engineering progress. At the same time it is planned that further specialized positions will be included in the future which are not yet covered by multilateral arrangements. Proceeding in this manner, it was possible to consummate the agreement with an unspecified duration.

The Multilateral Specialization Agreement has great politico-economic significance. With this agreement, the foundation is laid for the long-term achievement of important economic effects in selected fields in the individual countries through the application of microelectronics.

At the same time, the ratification of the agreement once more demonstrates that the socialist countries through their purposeful cooperation are in a position to counter the disruptive actions of the Carter Administration with substantial economic factors.

For the GDR the politico-economic significance of the agreement is embodied in the assurance that further development and production can be concentrated on chosen positions and that a stable and secure future is established for our computer industry.

What Focal Points Are the Basis for Multilateral Specialization and Cooperation?

First of all it should be noted that these basic directions are developed from the standpoint of product-related specialization. Specialization according to problem solutions was not appropriate since this would have created unnecessary complexity in negotiating the agreement. Also, account must be taken of the increasing tendency to realize the components of system support through hardware solutions. There are clear specifications dealing with cooperation in the area of applications and also a special labor committee within the framework of the Multilateral Governmental Commission plus anchoring of applications in the agreement itself. Proceeding on a product-oriented basis, the assets of electronic computer technology were divided into functional groups and subgroups for the basic thrusts in specialization. This breakdown tells us which products will be developed and supplied by whom.

In the area of complete ESER data processing installations, it is planned that the production of existing and the development of new installations will continue in accordance with established specialization guidelines. In line with the results of planning coordination, this means for GDR users:

--Small systems will still come mainly from Hungary, with smaller numbers coming from the CSSR.

--Medium-sized systems will be drawn from our own production (EDVA EC 1055) and will also be imported from the USSR (EDVA EC 1035).

--Large systems will be imported from the USSR (EC 1060 and larger).

At the same time it should be pointed out that Bulgaria, Poland and Romania have a relationship with regard to their own installations which is firmly established by the agreement.

In the area of peripheral equipment it was necessary to establish several functional groups because of the large number of equipment types. The most important are:

--External storage units

--Input/output devices

--Equipment for remote data processing

--Data acquisition equipment.

For GDR users, some of the versatile specialized products available from domestic production are the following:

--Magnetic tape equipment

--Data acquisition equipment

--Punched-tape input/output equipment

--Code readers

--Character printers

--CRT consoles.

Also, the GDR will continue to import the following items:

--Disk storage units, primarily from Bulgaria,

--Remote data processing units, primarily from Hungary.

Overall, it is expected that the countries responsible for the individual functional groups and subgroups will create the infrastructure required to perfect specialized computer technology to assure a high level of performance and the capability to compete in world markets. Assurance of equipment support is also expected. At this point, it is necessary to point out again that the agreement puts heavy emphasis on advancing scientific and engineering development through selecting the paths of development. As is well known, in the next few years installation and equipment performance can be increased through increased use of microelectronics, and the same holds for increased application of optical and acoustical effects in computers.

The countries which signed the agreement have taken it upon themselves to do all that is necessary for its realization. This means, among other things, including in national planning the agreements for mutual exchange worked out in harmony with the basic guidelines and the consummation of corresponding agreements and contracts for realizing cooperative effort and for securing mutual exchange. The Multilateral Governmental Commission, which is composed of representatives empowered to act for the participating governments, is authorized to direct and continuously monitor the execution of the Multilateral Specialization Agreements including making clarifications necessary for scientific and technical progress.

It is not important consistently to advance the work associated with the tasks and orientations of the multilateral agreements for specialization and cooperation founded on more than 10 years of good results from the cooperative effort in the field of electronic computers.

For the GDR this means, among other things, even greater utilization of the advantages gained from the experience with the EDVA EC 1055--a product of the agreement--in connection with further broad-based development and delivery of complete EDP systems, concentrating research and development potential on selected projects toward the end of shortening development and delivery schedules.

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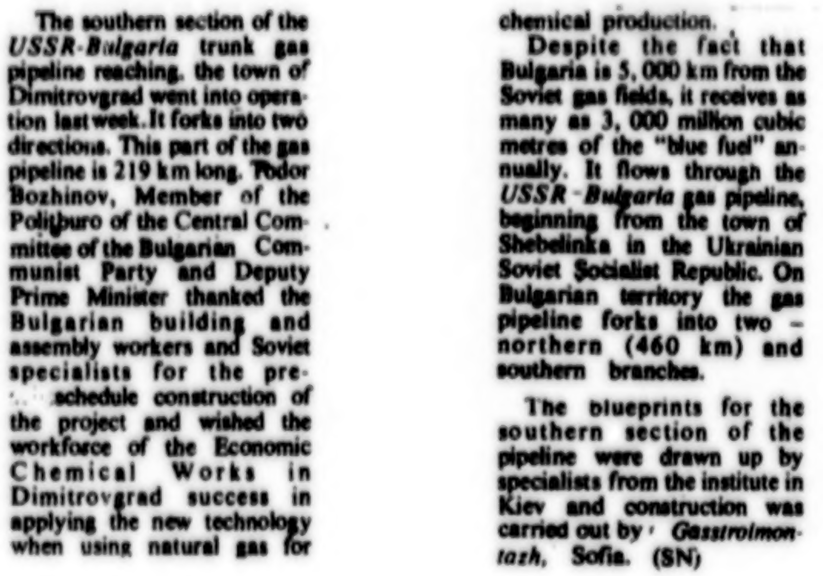
CSO: 2302/4

BULGARIA

SOUTHERN SECTION OF USSR-BULGARIA GAS LINE IN OPERATION

Sofia SOFIA NEWS in English 10 Jun 81 p 2

[Text]



The southern section of the *USSR-Bulgaria* trunk gas pipeline reaching, the town of Dimitrovgrad went into operation last week. It forks into two directions. This part of the gas pipeline is 219 km long. Todor Bozhinov, Member of the Politburo of the Central Committee of the Bulgarian Communist Party and Deputy Prime Minister thanked the Bulgarian building and assembly workers and Soviet specialists for the pre-schedule construction of the project and wished the workforce of the Economic Chemical Works in Dimitrovgrad success in applying the new technology when using natural gas for chemical production.

Despite the fact that Bulgaria is 5,000 km from the Soviet gas fields, it receives as many as 3,000 million cubic metres of the "blue fuel" annually. It flows through the *USSR-Bulgaria* gas pipeline, beginning from the town of Shebelinka in the Ukrainian Soviet Socialist Republic. On Bulgarian territory the gas pipeline forks into two – northern (460 km) and southern branches.

The blueprints for the southern section of the pipeline were drawn up by specialists from the institute in Kiev and construction was carried out by *Gasstroimontazh*, Sofia. (SN)

CSO: 2020/48

ECONOMIC RELATIONS WITH BELGIUM NOTED

Sofia SOFIA NEWS in English 10 Jun 81 p 2

[Text] The Economic and Technological *Days of Belgium and Luxembourg* held in Sofia between June 1 and 5, turned into a remarkable event of mutual cooperation and friendship. Organised by the Belgian Service for Foreign Trade and the Belgian-Luxembourg Economic Committee for Bulgaria, with the help of the Bulgarian Chamber of Commerce and Industry, the State Committee for Science and Technical Progress, the Central Council of Scientific and Creative Unions and *Bulgarreklama* Agency, they offered an occasion to hold important business talks and discuss the present state of trade, economic, scientific and technical links and the prospects for the 1980s. Representatives of over 20 prestigious firms, like *Bell Telephone, Cockerill, Epurex, Eternit,* ORFFA., *PB Gelatines*, etc., presented over 30 papers, illustrated with films or slides, showing some of their most interesting technical achievements, of interest to the Bulgarian economy mostly in the sphere of machine building, metallurgy and the chemical industry.

The Belgian Foreign Trade Minister Rober Jurbehn, who was on a visit to Sofia at the time, had talks with his Bulgarian counterpart Hristo Hristov and with the President of the Chamber of Commerce and Industry Peter Roussev. They discussed progress in two-way trade (its worth went up four times during the 1970s), experience gained from industrial cooperation (production of colour TV sets, electronic components, electric household appliances and other goods), economic, industrial and technological cooperation between them and in third countries, participation in fairs and exhibitions in both countries and the *Days of Bulgarian Economy and Technology*, organised in Brussels next year. The two Foreign Trade Ministers signed an intergovernmental agreement to expand economic, industrial and technical cooperation between small, medium-sized and cooperated enterprises in this country and in the Belgian-Luxembourg Economic Alliance.

Speaking to an SN correspondent, Foreign Trade Minister Rober Jurbehn expressed satisfaction with his visit to Bulgaria, with the talks he had had and the agreement signed, which, he said open prospects for a still broader trade cooperation.

After the *Cultural Week* held earlier this year, the June 1-5 event in Sofia again demonstrated Belgian respect for the Bulgarian people," said Rober Jurbehn, "as well as Belgium's desire to cooperate with Bulgaria which through its 1300-year-old history contributed to developing European culture. The present economic initiative coincides with the 13th century jubilee of the Bulgarian state and the beginning of a new five-year development in whose realisation we are interested, because its orientation to technological progress opens possibilities for the Belgian industry to participate in improving the Bulgarian infrastructure.

"Belgian firms have always wanted to expand their ties with Bulgarian trading partners," he further noted, "and in the past some of them have contributed to the setting up of industrial capacities. Contacts and the exchange of economic delegations lead to gaining better knowledge of the markets but greater efforts should be made in this respect. The application of the new economic system, involving competitive elements is of great interest to us. Favourable opportunities are at hand for expanding two-way cooperation in a number of developing countries where our Bulgarian partners are widely known and Belgian firms may join in successfully. Along with promoting other forms of cooperation, we shall thus be able to expand trade in the future as it still falls far short of Belgium's and Bulgaria's potentials. (SN)

CSO: 2020/48

STRATEGIC TASK FOR METALLURGY DESCRIBED

Sofia SOFIA NEWS in English 10 Jun 81 p 2

[Article by Hristo Bonin, deputy minister of Metallurgy and Mineral Resources]

[Text] During the Eighth Five-Year plan period (1981-1985) and the beginning of the Ninth Five-Year period, an ambitious programme for the development of Bulgaria's ferrous metallurgy is to be implemented. Its purpose is to help more fully meet the country's needs for high-quality steels and substantially improve our position on the international market for ferrous metals.

By the end of 1985 reconstruction is to be completed of the *Lenin* Iron and Steel Works in Pernik. This will make it an up-to-date enterprise capable of turning out over one million tons of good-quality and high-grade steels. A new continuous-smelting and casting workshop is to go into operation this year. In addition, construction has begun near Bourgas at the seaside of a new iron and steel works. It will have a modern equipment and will produce a wide range of alloy and other high-quality steels, as well as stainless, heat-resistant, and tool steel.

During the current five-year period construction is to begin near Plovdiv of a modern plant for cold-rolled and stainless sheet and strip used in electrical devices.

Most up-to-date technologies are prepared for the production of high-grade steels. Treatment with argon gas is now being experimented with. By 1985 it is to be widely introduced into practice. Vacuum production, soon to be introduced at the *Kremikovtsi* Iron and Steel Works near Sofia, will provide ample opportunities for making steels of high operational performance. The method of a constant steel smelting and casting is being mastered. It is a technology which will lead to big savings of metal and energy.

The Institute of Ferrous Metallurgy in collaboration with metallurgical plants, is to introduce new products.

Making high-grade steels is an extremely complex process, requiring modern equipment and a large staff of highly skilled specialists. Until recently, the sole producers of this type of steels were countries with long traditions in the sphere of ferrous metallurgy. In Bulgaria, this sector is developing as a result of active cooperation with the Soviet Union and direct technical assistance from Soviet specialists. The sector can now successfully cope with the complex task, but requires the nationwide solution of a number of big problems such as a steady supply with raw materials and energy, large-scale and rapid construction of facilities and the training of specialists.

The programme for the development of Bulgarian ferrous metallurgy during Eighth Five-Year plan period can be fulfilled. It only requires ever deeper integration and expansion of cooperation with the socialist countries, above all with the Soviet Union.

CSO: 2020/48

PHARMACHIM'S INTERNATIONAL TIES CITED

Sofia SOFIA NEWS in English 10 Jun 81 p 2

[Article by Georgi Vassilev]

[Text] Thirty five years ago there was only one small factory for medical preparations in this country. Today Bulgaria's chemical and pharmaceutical industry incorporates 13 modern works and plants within the *Pharmachim* Association. In 1981, some 2,800 items figured on its production list such as antibiotics, microbiological products, medicines, veterinary preparations, perfumery and cosmetics. Over 70 per cent of this production finds a ready market in 90 countries. For its various activities, *Pharmachim* engages the services of highly-skilled specialists from the Bulgarian Academy of Sciences, the Higher Medical Academy, and higher educational establishments in the country. *Pharmachim* makes reasonable and expedient use of foreign experience by closely collaborating with leading firms from the socialist and the developed non-socialist countries.

Five years ago Bulgaria signed multilateral and bilateral agreements on cooperation and specialisation in the production and mutual delivery of pharmaceutical products with the German Democratic Republic, Cuba, Poland, Romania, the Soviet Union, Hungary and Czechoslovakia. Bulgaria specialises in the production of 35 such products, and receives around 150 of them. This accounts for more than 50 per cent of the imported pharmaceutical preparations. This specialisation will continue until 1985 and is expected to more than double in terms of quantity and value, in comparison with 1980. Programmes of scientific and technical cooperation within the framework of the Council for Mutual Economic Assistance (CMEA) have been coordinated and technologies and recipes are exchanged.

Over the past 15 years a favourable groundwork for cooperation with prestigious western firms was created. These are *Bayer*, *Höchst*, and *Schwarzkopf* from the Federal Republic of Germany, *Sandoz* and *Ciba-Geigy* from Switzerland, *Rhône-Poulenc*, *Oreal* and *Christian Dior* from France, *ICI* from Great Britain, etc. Bulgaria receives from them active substances which *Pharmachim* uses for ready-made medical preparations.

Negotiations are currently under way with British, American, French, West German and Dutch firms on the establishment of cooperation in the production of synthetic aromatic products, perfumery and cosmetics items and on expanding production of vitamin C.

Pharmachim has worked out a special programme for brisk business contacts with a series of well-known French firms. The purpose of all this is to set up production enterprises, entitled to use French technologies under a license.

New trails are blazed for cooperation with other countries. *Pharmachim* is negotiating with Brazil, Mexico and Yugoslavia on joint work in the production of antibiotics and other pharmaceutics. The Bulgarian-Indian Joint Association *Curewell*, which produces medicines, is yielding good results. There has also been progress in the talks with Libya, Mozambioue and Nigera on the construction of joint projects for the manufacture of ready-made medical forms. *Pharmachim* will supply these enterprises with active substances.

This mutually advantageous cooperation in its various aspects will continue in the future. New medical preparations will be added to the production nomenclature, and Bulgarian exports will expand. This country will make its contribution to the establishment of production pharmaceutical facilities in the developed countries as well.

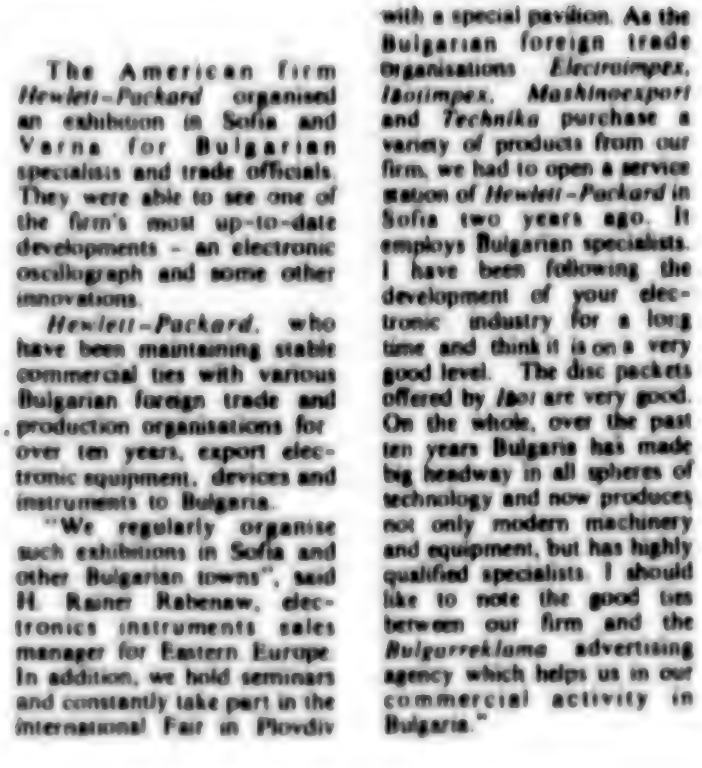
CSO: 2020/48

HEWLETT-PACKARD EXHIBITION DESCRIBED

Sofia SOFIA NEWS in English 3 Jun 81 p 2

[Article by Lev Kokoushkin]

[Text]



The American firm *Hewlett-Packard* organised an exhibition in Sofia and Varna for Bulgarian specialists and trade officials. They were able to see one of the firm's most up-to-date developments - an electronic oscillograph and some other innovations.

Hewlett-Packard, who have been maintaining stable commercial ties with various Bulgarian foreign trade and production organisations for over ten years, export electronic equipment, devices and instruments to Bulgaria.

"We regularly organise such exhibitions in Sofia and other Bulgarian towns", said H. Rainer Rabenaw, electronics instruments sales manager for Eastern Europe. In addition, we hold seminars and constantly take part in the International Fair in Plovdiv with a special pavilion. As the Bulgarian foreign trade organisations *Electroimpex*, *Isotimpex*, *Mashinoexport* and *Technika* purchase a variety of products from our firm, we had to open a service station of *Hewlett-Packard* in Sofia two years ago. It employs Bulgarian specialists. I have been following the development of your electronic industry for a long time and think it is on a very good level. The disc packets offered by *Isot* are very good. On the whole, over the past ten years Bulgaria has made big headway in all spheres of technology and now produces not only modern machinery and equipment, but has highly qualified specialists. I should like to note the good ties between our firm and the *Bulgarreklama* advertising agency which helps us in our commercial activity in Bulgaria."

CSO: 2020/48

HIGH-QUALITY MEASUREMENT INSTRUMENTS DESCRIBED

Sofia SOFIA NEWS in English 10 Jun 81 p 2

[Text] The Managing Director of the Works for Measurement Instruments and Tools in Blagoevgrad Atanas ONTEV was interviewed by SN correspondent Alexander Alexandrov.

Our Works, the Director explained, is the only one in the country specialised in making instruments and tools used to measure linear and angular dimensions. They serve thus to control the accuracy of the size of parts and products, and have a wide application in industry. In fact the quality of every mechanical product depends on their accuracy. Our production programme includes SCREW GAUGES (internal and external), GALLIPERS FOR SHAFT AND HOLE DIAMETERS, DIAL GAUGES, MICROMETERS, SLIDING CALLIPERS (FOR TURNERS), CHECKING GONIOMETERS, BEVEL PROTRACTORS, LENGTH MEASUREMENT PARALLEL GAUGES, NON-STANDARD GAUGES, PNEUMATIC GRINDING AND FINISHING TOOLS, ELECTRONIC GAUGES FOR LINEAR DISPLACEMENT, and THERMO-REGULATORS FOR ELECTRIC BOILERS.

How is research, development, design and construction works organised in your enterprise?

The Works uses the services of the Institute for Instrument Making which is a subsidiary of the PRIBOROSTROENE I AVTOMATIZATSIA (Tool-making and Automation) State Economic Association. Two of the sections of the Institute, 'Displacement Gauges' and 'Discreet Pneumatic Devices' work exclusively for us. Their designs are developed further in our centre for development and implementation into manufacture, which in fact works out the production technologies. Moreover the Development Centre does a lot of research and design on themes related to the further development and expansion of our Works. The workforce are young and close-knit, and they manage to handle most of the problems that crop up in the course of manufacture.

What quality is achieved in your Works and are your products mainly measuring instruments sensitive to climate changes?

In principle our instruments are not affected by changes in the climate and weather, although some of them which measure to an accuracy exceeding hundredths of a micron must at all cost be used in temperatures of 20°C. As to the effectiveness of our products, they are in good demand on the market which attests to their quality, too. Their comparatively low cost is of course a factor worth consideration.

How does your Works participate in CMEA

(Comecon) integration, and in Bulgarian–Soviet economic cooperation?

We are a typical example. The technological design and the whole plant have come from the Soviet Union. The building of the Works, the assembly and fine-tuning of equipment and the air-conditioning would have been unthinkable but for the help we received from our Soviet friends. Our engineers specialised in Moscow, Leningrad, Stavropol and elsewhere. Much of our output is destined for the CMEA member-countries, mostly for the USSR and the GDR. This of course does not mean that we do not export to the other socialist countries. Working groups of CMEA coordinate the scientific exchange and cooperation of the separate institutes.

There is a good demand for our product abroad, because our customers have become convinced of its reliability. We have had no claims so far. And if our instruments are still not sufficiently well-known on the capitalist market, apart from West Germany and Sweden (where they are), this is because we could not until recently produce enough to meet demand.

How do you see the future of the Works?

The Management plans expansion in three main directions: manufacturing mechanical measurement instruments and tools, making a range of electronic gauge systems for linear displacement (along several coordinates and with different accuracy), and the production of a range of pneumatic tools (winding, grinding, finishing, boring, threading, etc). The electronic systems of the second direction will be destined mainly for being built into, or coupled with, machine tools. At present we are making a pilot series of a portable profile gauge for use in the shop (we so far had only laboratory ones) and a peristaltic pump for use in medicine. As from this year our shop for non-standard measurement tools and instruments will have the capacity to execute also orders from foreign firms.

CSO: 2020/48

BIOPLANTS VIEWED AS PLANTS OF FUTURE

Sofia SOFIA NEWS in English 3 Jun 81 p 2

[Article by Svetoslav Roussev]

[Text] Man has been growing plants and animals since the New Stone Age to meet his life's necessities. Now is the time of microorganisms, the bioplants that are invisible with the naked eye. They can successfully replace basic sectors of modern industry, sectors which indiscriminately poison the environment and waste untold quantities of energy and substances.

A very large number of microorganisms and over 850 excellent catalysts of nature, enzymes and ferments, have now been studied. The development of methods for growing microorganisms and the artificial creation of enzymes and ferments, hence their industrial use, is one of the leading trends of present-day scientific and technical progress.

Bulgarian scientists too are working hard in this sphere. The decisions of the 12th BCP Congress say that during the Eighth Five-Year plan period (1981-1985), industrial microbiology is to develop at priority rates. A number of reliable developments have been completed at the Bulgarian Academy of Sciences Microbiology Institute. One of the most interesting of these is the use of the enzyme-glycomyel to obtain sugar from maize. The enzyme converts the maize into starch, and the starch turns it into glucose-fructose. It has a much higher sugar content than saccharose. Industrial experiments have been successfully carried out at the pilot plant in Botevgrad.

What is the practical importance of these developments? It is widely known that the production of sugar from sugar-beets requires the application of industrial technology, as well as costly equipment and the energy consumption is very high. One of the most difficult processes in sugar production is its refining before the final product is obtained. Sugar is in great demand, as its consumption is increasing and its price on the international market has been steadily rising.

Sugar production with the help of the enzyme glycomyel will reduce the costs of the final product many times over. It will also lead to the saving of investments for additional production capacities and refineries and large quantities of energy. What is more, the environment will not be contaminated by factory chimneys and waste waters. Thanks to the high sugar content of glucose-fructose, it would take only 100,000 tons of maize to satisfy the country's annual needs for sugar.

Work is also proceeding at the institute on obtaining tartaric and citric acids with the help of enzymes, as well as on obtaining nitrogen gluconate which is a valuable anti-corrosive substance. A rennet has also been obtained from enzyme preparation, and successful experiments have been carried out with antibiotics to be used in agriculture and for their introduction.

The Microbiology Institute in Sofia takes an active part in scientific and technological cooperation within the framework of the Council for Mutual Economic Assistance (CMEA). Contracts are now being specified providing for mutual work in 1981-1985 with kindred institutes in the Soviet Union, Czechoslovakia, Vietnam, Mongolia and other CMEA countries. Preparations are in progress for broad scientific cooperation with Austria.

The specialists at the institute work fully aware, that they are blazing one of the most important trails of the future industry, which will be of a marked biological character. If "farms" for microorganisms are set up, which would link the atmospheric nitrogen with hydrogen without the use of any equipment fertilisers will be obtained involving no outlay and in no way inferior to manure. There will no longer be the need for the construction of big nitrogen fertiliser plants incorporating sophisticated and costly equipment from special alloys, withstanding high temperature and pressure. The heavy chemistry plants can then be constructed from light and cheap materials, such as fibres and plastics. They will consume small quantities of energy and industrial water, and will be clean and quiet laboratories without the thunder of machinery, without soot and smoke.

The manufactured products will be of new quality. Today they have foreign substances. Even the catalysts impart some of their particles to the finished product. The live catalysts, however, enter into no intermediary reactions. That is why the final products are quite clean. This saves the live cell the "costs" involving refinery which is indispensable for the chemical industry nowadays.

The microorganisms, carrying out useful work, can be widely applied, even in machine-building. There are bacteria which "eat" iron and can polish metal surfaces at low costs and much more finely than the most precise grinding machines.

Microbiology sets itself far more ambitious tasks: for instance to restore nature to what it was like before industrialisation came to our planet. This could be done with the help of microorganisms which are capable of performing miracles as they possess an unlimited quantity of bioorganic energy of reproduction. The problem is for it to be properly directed by man.

CSO: 2020/48

CZECHOSLOVAKIA

COMPUTER TECHNOLOGY FOR CSSR COMMUNICATIONS IN 1981-1985

Prague PTT REVUE in Czech Feb 81 No 2, pp 59-61

[Article by Eng Zbinek Jandik, Federal Ministry of Communications: "Computer and Organization Technology for AMS in the Communications Sector in the Seventh Five-Year Plan"]

[Text] The technical base plays a criticial role in the process of developing AMS [automated management systems], since its development and utilization determine how quickly and to what extent we can improve the management system and the work of management personel.

In the Sixth Five-Year Plan, the plan for development of the technical base for communications AMS was fulfilled for third-generation computers (EC 1030 and EC 1033). Not all objectives were met in the development of minicomputers and data collection and transmission equipment.

The highest-level part and state officies are continually emphasizing increased thrift and efficiency in the use of data-processing equipment as a tool of management. Several measures have been adopted, including the recommendation that the solution of questions of developing the technical base during the Seventh Five-Year Plan with maximum thrift be begun and that attention in this activity be directed particularly toward:

--the expansion and putting into use of small computer systems as an important component of the rationalization of administrative work;

--the use of effective forms of data collection and transmission and of the requisite reproduction and micrographics equipment;

--the distribution of data-processing equipment, which must be based on requirements for furnishing computer capacities for the construction and operation of AMS;

--computer and minicomputer software, with an emphasis on the use of uniform progressive systems.

This recommendation aims at the principal goal, which is more consistent, more effective and more efficient use of data-processing equipment, leading to increased standards of management work in all offices and organizations.

The Technical Base for AMS in the Communications Sector During the Seventh Five-Year Plan

In the process of building the AMS technical base, during the Seventh Five-Year Plan the main emphasis should be placed on fulfillment of two principal tasks:

--more economical and effective utilization of computer and organizational equipment installed in the Sixth Five-Year Plan;

--modernization and further development of AMS equipment so as to introduce it more quickly into routine operations, making the technical base meet the demanding requirements for AMS in the Seventh Five-Year Plan.

In carrying out the first of these tasks we must bear in mind that it is especially the already-installed third-generation computers which will represent the bulk of the AMS computer base in the first years of the Seventh Five-Year Plan. Continual improvement of their technical capabilities (suitable expansion of configurations, the search for new forms of cooperation between systems, use of the results of the efficiency-improvers' movement and the like), and systematic improvement of the quality of technical operations (adherence to operations and servicing norms, improvement of technicians' labor productivity by decreasing the time spent locating malfunctions and the like) will make it possible to create in these dystems a favorable condition for providing the critical machine capacity at the beginning of the Seventh Five-Year Plan.

The second task is accomplished by fulfilling the plan for the technical base in the Seventh Five-Year Plan

As regards computers, the modernization of second-generation machines and the further expansion of computer capacities has been planned for exclusively by the introduction of general-purpose EC 1025 systems.

AMS design at the enterprise level mainly presupposes the introduction of minicomputers of the SMEP [Systems of Small Electronic Computers] series, or in some cases the ADT [Automated Data Transmission] series.

With regard to data coll tion and acquisition, the VAKUS organization [Communications Computation and Control Center] plans to modernize obsolete punched-card equipment and expand data acquisition capacities by introducing equipment for direct entry on data onto magnetic media, using primarily the SPU 800 unit with input onto magnetic tape cassettes, and Consul 2713 and 2714 equipment with recording on floppy disks.

During the Seventh Five-Year Plan, communications organizations and centers with decentralized data acquisition will use principally DARO 1720, FELIX FC 64 and Consul 261 paper-tape equipment. As the use of SMEP minicomputers becomes more widespread, we may expect that these organizations will preprocess and convert data from punched tape to standard magnetic tape, thereby improving the quality of input media for further computer processing.

The planned more extensive information system using remote data transmission and processing will be implemented and tested in its first stage in a system of connected SMEP minicomputers. In the second phase, it is expected that the network of minicomputers will be gradually connected to JSEP [Unified System of Electronic Computers] machines, which will be able to meet the requirement for batch processing, which is more capacity-intensive.

An inseparable component of the AMS technical base for the communications sector is reproduction and micrographics equipment. It will have a broad scope of use and will be an indispensable assistant for information workers and users. The coordinated development of reproduction and micrographic equipment and methods in the Seventh Five-Year Plan is aimed primarily at gradully speeding up and improving the quality of information activities, decisionmaking processes and thus the entire management process. In connection with the more economical and efficient use of data-processing results, attention is being directed [illegible] this area primarily to COM [computer output on microfilm] systems. Reproduction and micrographic equipment have undergone further development recently. To orient prospective users, in 1981 the "Modernized Standard Series of Reproduction and Micrographics Equipment" was developed; it will be published in a supplement to VESTNIK FMS [Herald of the Federal Ministry of Communications] during 1981.

Principal Characteristics of Certain Types of Computer Hardware for the Seventh Five-Year Plan

Since the computer hardware in question has long since been described in detail in technical or production literature, in this section we present, for the sake of completeness, only the essential information on it.

The EC 1025 Computer

The EC 1025 computer system is a Czechoslovak-produced general-purpose digital computer included in the JSEP 2 series. It maintains upward compatibility with other computers in the series.

The computer embodies all the important 3.5th-generation functions, providing system reliability and universality (use of medium- and large-scale TTL integrated circuits, modular structure, virtual memory, microprogram control, protection against failures and automatic processing and indication of breakdown conditions, high-level diagnostics).

The basic unit, the EC 2025, is built up of independent microprogram-controlled modules.

The main characteristics of the modules are:

--standard modules;

--the operating module, intended for reading and carrying out instructions,

--the main memory module, capacity 128 Kbyte per module (two modules can be installed),

--the service module, used for initial loading of the microprograms into the control memory of individual modules from disk storage and for processing information on system malfunctions,

--the organizational module, which controls module interface with main memory and with other modules,

--the disk module, used to interface up to four disk drives, with a capacity of up to 100 Mbyte each,

--the multiplexer module, intended for interfacing a standard channel with up to 32 subchannels and up to 10 controllers;

--Special modules;

--a tape module, intended for interfacing up to six magnetic tape units (without controller),

--the communications module, intended for a remote-processing system, which makes possible the interfacing of up to six synchronous communications links.

The computer has a universal instruction set of 175 instructions. The operation speed is 30,000-50,000 operations per second, and the memory cycle is 0.6 ns (semiconductor memory).

The computer's peripherals include:

--an EC 5066 magnetic disk drive with a capacity of 100 Mbyte;

--an EC 5004 magnetic tape drive;

--an EC 6016 card reader and controller;

--an EC 7034 line printer and controller;

--an EC 5075 floppy disk I/O unit with controller.

The computer software is disk oriented and is contained in the DOS 3/EC operating system. The Assembler, RPG II, Fortran IV, COBOL, Pascal, Simscript, Systran, PL/S and PL/1 languages can be used.

The SM 4-20 Minicomputer

The SM 4-20 Czechoslovak-produced general-purpose computer system is intended for real-time operation. The optional equipment, software and the main memory size make it possible to use the system for:

--control of manufacturing processes;

--data collection and preprocessing;

--creation of computer and terminal networks;

--scientific and technical computations;

--information systems and the like.

The system is compatible with the SM 3-20 and up.

The SM 4-20 base complex is composed of the following units:

--the basic module, including the processor, program load module, operator's panel, 128 Kbyte main memory and disk drive controller;

--a paper tape I/O unit;

--a disk pack drive.

The basic computer system includes:

--the CM 7202 display unit;

--the CM 7108 matrix printer;

--the CM 6208 paper-tape reader and punch;

--the CM 5400 disk pack drive with a capacity of 2 x 2.5 Mbyte;

--an asynchronous adapter for interfacing the display and printer;

--a parallel adapter for interfacing the paper-tape station.

These peripherals can be expanded to include:

--a CM 5302 standard magnetic tape drive;

--a CM 5604 2 x 2.5 Mbyte floppy disk drive;

--a CM 6313 line printer.

The basic software for the SM 4-20 is the DOS RV 2 operating system, intended for an extremely wide range of applications. The system can be used for real-time applications requiring a response time to external events on the order of a few milliseconds, while on the other hand it can be used for batch processing.

Other software for the SM 4-20 includes:

--TMOS 1, diagnostic programs on floppy disk or magnetic tape;

--LOOS, a paper-tape system, intended for small configurations;

--FOBOS 2, a disk system (intended for interactive program development);

--DIAMS 2, a time-sharing multiuser system.

Installing the SM 4-20 minicomputer system does not entail any special area modifications or power demands. The system can be installed in offices, since the usual configuration can be operated in an area of 20 square meters, weighs less than 500 kg and draws 3.5 kVA (220 V.)

The system's main capacities are expected to be in processing of enterprise assignments in the context of in-house computer centers. The use of these systems will be managed by a uniform operating series of data collection and preprocessing centers, which will constitute part of the "uniform procedural base for communications sector AMS."

The SM 50/40-1 Microcomputer

The SM 54/40-1 is a Czechoslovak-produced microcomputer system intended for:

--control of manufacturing processes;

--data collection and preprocessing;

--control of terminal and terminal networks;

--control of a variety of technical operations.

The system consists of the following set of modules:

--the main SM 50/40-1 module;

--the main memory module with a maximum addressable capacity of 64 Kbyte;

--the programmable serial interface module, e.g., IRPS or S2 V24CCITT modules;

--a digital I/O module;

--an analog I/O module;

--a floppy disk controller module.

The system is designed in three variants:

--for mounting in standard SMEP frames;

--for installation in other equipment;

--for building into A/C [Automated control?] video terminals (using the design of the CM 7202 display unit).

In addition to hardware, software is also being prepared for the SM 50/40 system, including the main control programs for real-time operation. A "microcomputer development system" using floppy disks, a hardwired emulator and program 'ebugging and system monitoring software has been developed for preparing system applications.

The range of applications of the SM 50/40 microcomputer can be divided into two groups:

--systems in which the microcomputer functions as a directly operated minicoputer, i.e., when it acts as an independent functional unit;

--systems in which the microcomputer functions as a single-purpose online component.

In the first group of applications, the advantages of using a microcomputer rather than a minicomputer are the following:

--higher operating speed;

--more effective instruction set;

--faster alteration of system capabilities in modernization or expansion;

--ease of response to purchaser requirements;

--high reliability;

--lower price.

One disadvantage is the limited main memory of the system, a maximum of 64 Kbyte.

The other applications area includes use of the microcomputers primarily for monitoring and controlling manufacturing processes. Here the microcomputer's extreme flexibility comes into play, providing the capability for solving a whole scale of problems while maintaining the same configuration. In most cases, major changes can be made in the behavior of the entire system by a simple change of program, or by a suitable change in the interfacing.

The SPU 800 Data Collection System

The configruation of this system, intended for acquisition of input data for the computer, includes the following modules:

--TP8 terminal processor;

--the Consul 259 keyboard and display unit;

--a cassette magnetic tape store;

--a P4K main memory.

The TP8 terminal processor is the nucleus of the system, to which other sets of equipment are connected. It carries out the necessary instructions, which are entered from a keyboard or read out of memory. It can effect various information transfers, inputting of symbols, arithmetic and logical operations, and direct, and indirect and conditional jumps.

Machine language or assembly language is used to program the system.

The cassette tape memory is intended for recording and reading of information. The cassette memory includes a controller, an interface board, a power supply and two cassettes. The cassette capacity is 2 x 250 Kbyte, and the recording density is 32 bits/mm.

For recording on standard magnetic tape, the data acquisition center must have at least one SPU 800 unit with an expanded configuration including a CM 5300 tape drive. This equipment is used to transfer entries from cassette to magnetic tape for entry into the computer.

The majority of the technical base for the communications sector AMS for the Seventh Five-Year Plan is CEMA equipment, primarily Czechoslovak-produced JSEP and SMEP equipment. In selecting the equipment for the technical base account was taken primarily of the guidelines and aims for fulfillment of the demanding tasks in the communications sector AMS and the principles of maximum thrift and efficiency were followed.

The computer, minicomputer and other equipment levels are represented primarily by a unified general-purpose system assuring the use of standardized forms of processing, interchangeability and cooperation in connected systems. The technical design, modularity, software and auxiliary equipment of these systems make the AMS technical base as a whole up-to-date, creating a new possibilities for its use in all sectors of the Ministry of Communications.

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BRIEFS

NEW STREETCAR PLANT--A groundstone was laid in Prague 9-Zlicin on 12 June 1981, for construction of one of the largest streetcar manufacturing facilities in the world. This facility, which will take 8 years to build and occupy 42 hectares of land, will be able to produce 1,700 streetcars per year. [Prague SVOBODNE SLOVO in Czech 13 Jun 81 p 1]

COSMIC RADIATION COOPERATION--A "supermonitor" produced by laboratories of the Institute of Experimental Physics, Slovak Academy of Sciences, in Kosice, has been modified and improved at its location at the Cosmic Radiation Laboratory on top of Lomnicky Stit in the High Tatra Mountains, Slovakia. The data obtained by this "supermonitor" is shared with the Soviet research station Vostok in the Antartic.[Text] [Bratislava ROLNICKE NOVINY in Slovak 8 Jun 81 p 4]

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HUNGARY

PRODUCTS OF COMMUNICATIONS TECHNOLOGY INSTITUTE DESCRIBED

Budapest KEP ES HANGTECHNIKA in Hungarian Apr 81 pp 59-63

[Unsigned article: The Communications Technology Industry Research Institute."]

[Text] The Contacts of the Institute

In the course of research and development on microelectronic parts the Communications Technology Industry Research Institute (HIKI), which has been in operation for nearly 30 years, deals with an entire vertical technology and in accordance with this its contacts are very broad. Research on the design or modern electronic parts and on the manufacturing technology to produce them constitutes the marrow of the task. It is self-evident that some of the technological tools for research and development work are produced in the laboratories as part of the technological research because the very long time required to obtain some equipment would hold back progress. Similarly, in many cases experts of the Institute design and fabricate the instruments to control manufacture and test the final products.

At the beginning of the Fifth Five-Year Plan--recognizing the signal significance of close cooperation between users and those producing circuits--we created, with the support of the National Technical Development Committee, the Hybrid Circuit Applications Technology Service, which has the task of domestic propagation of hybrid circuits. The essence of this work is to make possible, even in the developmental stage of equipment, the development of personal contact between the experts of the enterprise manufacturing the equipment and the circuit designers of the Institute. These contacts have developed already with many communications technology enterprises and ensure the following advantageous conditions:

--one can avoid the hybrid realization of circuit tasks based on classical elements, which in the majority of cases is a forced, technically obsolete solution;

--one can develop a new system technology for equipment or individual units thereof which are suitable for hybrid circuit realization;

--the task defines the specifications of the individual circuits; they are not defined by the specifications of circuits made up of traditional elements, and

--a hybrid circuit realization of the equipment on the basis of a uniform view makes possible a considerable reduction in size.

Instruments and Machines

In the course of technological research and development work the Institute deals with special care with the development of devices and equipment belonging to microelectronic research. Fruitful contact has developed in this area with the technologists of communications and vacuum technology enterprises. The Institute aids in the solution of the tasks of communications and instrument industry enterprises with individual machines, with the design of machine lines and with ad hoc manufacture. The Institute, which works basically on the solution of domestic research tasks, has won respect and recognition on the Central European market. The significance of export for the Institute is given by the fact that the domestic market is not sufficient for the development of special machines and instruments linked to technological research on electronic parts. In addition, the experts of the Institute would get very little experience if they only made a few special machines for the two or three domestic enterprises manufacturing parts. It is also advantageous for the two or three domestic enterprises manufacturing electronic parts that the Institute carried out assignments for a number of customers. The research and development experts also gain broad experience because in the course of installing equipment abroad they usually come in contact with equipment of different origin in those plants to which the machines prepared by the Institute are going.

As the research institute for production technology for electronic parts the Institute itself produces a signficant part of its manufacturing and metering equipment. Equipment for the new technological operations is not in series manufacture even in the industrially developed states when it is needed in the Institute for developmental work. Another reason for the development of its own equipment is that manufacturing equipment cannot be purchased because of the strategic and economic significance of the electronic industry. Measurement technique tasks arise in the course of technological research on parts and this leads to the specifications of the metering equipment. These measurement technique tasks are close to the technology and can be carried out advantageously in an atmosphere of common interest. The Institute deliberately strives to develop complete technological lines and to develop automatic metering equipment to increasingly satisfy the demands arising. Contacts become better planned in the initial stages and on the basis of the results of these contacts the development of equipment in the area of parts technology research has become significant, thus creating a basis for changing the production structure and for the development of modern product groups.

Reliability

The Institute contributes to the development of research and testing activity taking place in the area of reliability testing and to the selective development of electronic industry production. It is possible to determine the operational characteristics of discrete electronic parts and of integrated circuits using the testing methods which have been developed and the equipment which is available. The primary goal of this work is to provide the designers of electronic equipment with data about the life expectancy of parts to be built in and about:

--the extent to which a part meets the given operational requirements in regard to reliability;

--what measurement principles should be used to satisfy the previously defined reliability requirements to be made of a part; and

--how to predict the reliability of the equipment on the basis of these values.

Catalog Circuits

After this review of the activities of the Institute we should look more closely at the achievements of technological research. At the beginning of the spread of microelectronics the insulator-base technique and the semiconductor-base technique were regarded as two opposing possibilities and it was widely debated which would be the primary or only one. Now it is increasingly apparent that these two paths of microelectronics supplement one another. The customary semiconductor integrated circuits must provide the active functions; precision and performance can be increased and noise sensitivity can be decreased by means of thin and thick layer techniques. Significant savings in time can be achieved when designing highly complex equipment by the fact that the Institute designs individual partial units on the basis of customer specifications. In this way the customer can get integrated circuits meeting concrete, individual requirements. In the majority of bases the requirements can be put into a few main groups so that even hybrid circuits can be ordered by catalog type.

The applications of active RC filters are aimed primarily at replacing discrete LC filters in the sound frequency range, but especially under 200 Hz where the production of large volume inductivity is a necessary requirement. A number of advantageous properties make the broad use of such inductivity-free filters suitable for various applications:

--the filter does not contain inductivity, frequently very large in regard to its mechanical dimensions--which is difficult to handle during manufacture;

--the room required is very small (this is striking especially at low frequencies);

--the desired pass band amplification can be set with the filters, no separate amplifier is needed;

--in contrast to the LC filters one can easily realize finite suppression calculated on a theoretically unfinite frequency; and

--the great majority of the filters do not require external tuning and so can be used as circuit modules.

To a large extent the individual specifications of the various filters justify the hybrid integrated circuit solution for frequency selective circuits. Since the topical parameters of filters prepared with this technology can be set in the course of manufacture and since the technology gives other advantageous properties to the circuits the hybrid solution is obvious. As examples we might list a few of the characteristic properties given by such a technology:

--large circuit complexity;

--the low RC temperature co-efficient so important for frequency stability; and

--in general an external tuning element is not needed.

The filters developed by the Institute are built for cascade switching which is so outstanding from the viewpoint of design, construction and tuning. This means that in the case of filters with a higher number of stages (thus, in the case of a steep side gradient) it is necessary only to link in a chain a suitable number of tuned blocks.

Characteristic Filter Circuits

The HBP 12 is a thick layer hybrid integrated circuit which serves to select two-channel FSK data signals from the entire line band in accordance with CCITT standards. The sixth stage filter with Inverse Chebishev characteristics makes up, with an HLP low-pass and an HHP 06 high-pass circuit, a uniform two channel system. The uniform and completely tuned solution does not require external parts except for connections for power, input and output points and a few external short circuits. Power, plus-or-minus 15 V; current, 4 mA; transmission frequency range, 830 to 2,000 Hz; suppression variation in the transmission band, less than 3 dB; lower limit of the reject domain, 420 Hz; upper limit of the reject domain, 3,950 Hz; suppression in the reject domain, less than 35 dB; and amplification at 1,290 Hz, plus 8.6 plus-or-minus 2 dB.

The HHP 06 is a thick layer hybrid integrated circuit which serves to select the upper channel of two-channel FSK data signals in accordance with CCITT standards. The sixth stage filter with Inverse Chebishev characteristics makes up, with an HBP 12 band circuit and an HLP 07 low-pass circuit, a uniform two channel system. The input of the HHP 06 circuit is connected to the output of the HBP 12 circuit.

The uniform and completely tuned solution does not require external parts except for connections for power, input and output points and a few external short circuits. Power, plus-or-minus 15 V; current, 13 mA; lower limit of transmission band, 1,500 Hz; suppression variation in the transmission band, less than 3 dB; upper limit of the reject domain, 1,180 Hz; suppression in the reject domain, less than 26.5 dB; and amplification at 10 kHz, zero plus-or-minus 2 dB.

The HLP 07 is a thick layer hybrid integrated circuit which serves to select the lower channel of two-channel FSK data signals in accordance with CCITT standards. The sixth stage filter with Inverse Chebishev characteristics makes up, with an HBP 12 band circuit and an HHP 06 high-pass circuit, a uniform two channel system. The input of the HLP 07 circuit is connected to the output of the HBP 12 circuit.

The unit has a completely tuned solution and does not require external parts except for connection for power, input and output points and a few external short circuits. Power, plus-or-minus 15 V; current, 6 mA, upper limit of transmission band, 1,330 Hz; suppression variation in the transmission band, less than 3 dB; lower limit of reject domain, 1,650 Hz; suppression in the reject domain, less than 24.5 dB; and amplification at 100 Hz, zero plus-or-minus 2 dB.

The HHP 04 is an active RC filter realized with hybrid integrated circuit thick layer technology, permeable from above in the fourth stage elliptic. In two frequency signal transmission equipment the circuit serves to filter out the 425 Hz dial tone.

The unit has a completely tuned solution and does not require external parts except for connections for power, input and output points and a few external short circuits. Power, plus-or-minus 15 V; current, 12 mA; transmission frequency domain, 676 to 1,660 Hz; suppression variation in the transmission band, less than 0.5 dB; upper limit of reject domain, 440 Hz; suppression in the reject domain, less than 33 dB; value of amplification at 710 Hz, zero plus-or-minus 1 dB; and running time in the transmission band, maximum 2.3 msec.

The HLP 04 is an active RC filter realized with hybrid integrated circuit thick layer technology, permeable from below in the fourth stage elliptic. In two frequency signal transmission equipment the circuit is the low-passstage of the dividing filter. The unit has a completely tuned solution and does not require external parts except for connections for power, input and output points and a few external short circuits. Power, plus-or-minus 15 V; current, 12 mA; transmission frequency domain, 600 to 970 Hz; suppression variation in the transmission band, less than 1 dB; lower limit of reject domain, 1,209 Hz; suppression in the rejct domain, less than 25 dB; magnitude of amplification at 920 Hz, zero plus-or-minus 1 dB; and running time in the transmission band, maximum 2.2 msec.

The HHP 03 is an active RC filter realized with hybrid integrated circuit thick layer technology, permeable from above in the fourth stage elliptic. In two frequency signal transmission equipment the circuit is the high-pass stage of the dividing filter. The unit has a completely tuned solution and does not require external parts except for connections for power, input and output points and a few external short circuits. Power, plus-or-minus 15 V; current, 12 mA; transmission frequency domain, 1,175 to 2,000 Hz; suppression variation in the transmission band, less than 1 dB; upper limit of reject domain, 941 Hz; suppression in the reject domain, less than 25 dB; value of amplification at 1,210 Hz, zero plus-or-minus 1 dB; and running time in the transmission band, maximum 1.9 msec.

The HNF 01 is an active filter unit serving to filter out sinusoidal electric signals having a frequency of 50 Hz with a very narrow periphery. The unit has a completely tuned solution does not require external parts except for connections for power, input and output points and a few external short circuits. Power, plus-or-minus 15 V; current, 12 mA; and typical transmission amplification (zero Hz to 15 kHz), zero dB.

U/F/ Converters

The voltage-frequency converter occupies a special place in the populous group of analog-digital converters. It is a unit which can be used in many ways due to its single construction, its guaranteed monotonity and its guaranteed parameters between broad temperature limits. It is used in voltage meters, in signal transmission systems, as a programable generator, in high resolution measurement systems, in multi-channel, single-line measurement data collectors, to control stepping motors, etc.

The following are a few of the systems realized in practice: temperature-frequency converter, FSK transmitter; a digitally programable time signal generator; frequency-voltage conversion; U/F converter in a PLL; and bipolar voltage measurement with a U/F converter.

These proven solutions are contained in the publication titled "Applications Technology for U/F Converters," of the Hybrid Circuit Applications Technology Service working in the Institute.

PHOTO CAPTIONS

1. p 59. A switching power unit, characterized by outstandingly good efficiency.

2. p 59. Thick layer hybrid integrated circuits.

3. p 60. Equipment to sort high performance potentiometer cards.

4. p 60. Revolver-head chip-cementing device for hybrid integrated circuits.

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SCIENTISTS PRESENT VIEWS ON ELECTRONIC PROGRAM

Budapest HETI VILAGGAZDASAG in Hungarian 25 Apr 81 pp 38-39

[Article by Ivan Marschik and Tamas Urvolgyi: "Views on the Electronic Program, Ready, Set ...."]

[Text] The special electronic development program which lays out over a 10-year perspective the Hungarian path of development in one of the most important industrial branches of the modern era, is expected to be presented in the near future to the Council of Ministers for approval. Most of the experts who are concerned with this subject--whether they are researchers, developers, component manufacturers, or consumers--are waiting in starting position for the pistol to sound off at long last.

For a long time now it has been accepted as a fact by not only the technicians who are enamoured with their industrial branch but also commercial people that the electronic industry in some way influences the world market salability of all agricultural, industrial and also intellectual products. Frequently it does so directly as when the product includes an electronic component (for example, microprocessor guided household appliances, automatic machine tools, various kinds of measuring instruments, and computer equipment; and in many cases it does so indirectly as when electronic components are built into the equipment used in the course of manufacture.

Hungarian industry is, of course, no exception to this fact or that the fate of every industrial branch, and particularly of the electronics industry, is particularly dependent on the background industry and a high-level electronic components manufacture. Thus we can protect the position we have gained in international work specialization if Hungary also gives birth to an electronic component background of appropriate level--as the first step to creating a developed electronic industry.

These views, of course, are not new. They were evident already in May 1979 when the concept of the special electronic development program was placed before the State Planning Committee. That body decided at the time on preparing the program, and a program office for guiding the work was set up. In the approximate year and one-half which has passed since the "pistol sounded" the preparers of the program have performed a very great deal of work, and they had to devote a part of their energy to struggling with the representatives of individual or group interests, or with the unversed. "We have to eliminate the conflict of interests between industrial research, development and production", urged Gyula Tofalvy, the former leader of the program office, at a professional conference which dealt with one theme for 2 years.

According to the program, 60 to 65 percent of the domestic demand for electronic components must be met from domestic manufacture by 1990. But it will be necessary to produce more of these components than meet the domestic requirement to the extent that the remainder can be used in exchange for imported components.

A qualitative change in the full range of components manufactured at present will also take place by 1990. According to the program, the increase in the production of microelectronic components over the next 10 years will be about eight times more than at present.

The prepared program was placed on the desk of the State Planning Committee in November of last year. The decision was made that the document would be presented to the government in 1981. But in the meantime the implementation of certain parts of the program could be started (the manufacture and industrial coordination of certain parts, and related research development).

It is evident from the foregoing that the supporters of the program were not always of one view. According to the defenders of the program this is the 12th issue: the large-scale development of the electronic industry cannot be delayed any longer. The experts we questioned commented on this.

Tibor Vamos, director of the MTA [Hungarian Academy of Science] Computer and Automation Research Institute: The creation of a modern semiconductor industry is an important element of our technical future. If we do not have an adequate supply of components, our entire communications, computer and equipment industry will become impossible. Our experience in the past 10 years shows that an assembly industry which is based only on imported components is not viable either economically or technically. Economically, because it deteriorates our foreign trade equilibrium more and more; technically, because it cannot rely on a range of components that is the most modern and appropriate.

Because of the present significant capitalist import of electronic components, it is of course difficult to speak of electronic independence, or to dream of it; at the most it is possible to make the dependence more mutual. We also know that absolute embargoes do not exist. Our difficulties for the time being, however, are linked to the foreign trade equilibrium rather than to any kind of embargo. The COCOM lists (register of those products that are forbidden for export from NATO countries to socialist countries) are changed in accordance with progress in socialist development: the exclusion limits are always drawn one level higher.

The lesson, therefore, is that we must start the components program. But the component demand of the domestic industry is not so great that it can maintain an independent semiconductor industry. Still the program must be started--although we may already be 10 to 15 years late--and on the basis of the strategy that in this way we will participate in international cooperation, or to put it plainly, we will export as well as import. Thus the industrial branches we create will have to be manysided, because this is the condition for anyone to have anything to do with us.

Mihaly Sandory, deputy director of the Central Physics Research Institute: In the 1950's the assembly industry was developed in Hungary because this created a great deal of work opportunity with little investment. The so-called technology intensive places of work were not created partly because of the limited material possibilities and partly because of the shortage of intellectual capacity, and thus the development of the electronic industry was forced into the background. At the end of the 1960's component acquisition from capitalist sources became more and more difficult as a consequence of the fact that the military importance of electronics increased. Meanwhile, the intellectual capacity of the country rose to a level appropriate for component manufacture. Today we can make the most modern electronic components, but in negligible unit numbers and thus at extremely high cost. High-level equipment can also be manufactured with out-of-date technology in appliance manufacture but at great expense.

Therefore, until we create the technical and technological level suitable for the production of domestic electronic component manufacture appropriate to large series and we extend steady development possibilities, the Hungarian electronic industry will be forced to rely on Western components to a great extent. The consequence of this dependence will be a chronic lag over years.

Rudolf Molnar, director and Janos Goblos, technical deputy director, of the Remix Radio Enterprise: Complex integrated circuits (LSI, VLSI, etc) dictate the tempo, drawing behind them the development of other components; but we should not forget that without the other components (batteries, elements serving microprocessors, connecting and other mechanical components) the stars of electronics are helpless by themselves.

The producers do not have entirely the same problems as the researchers. For the rational manufacture of components, for example, it is necessary to have rational inventories. Unfortunately, the enterprise development base is not even sufficient for level maintenance. But the electronic industry puts different requirements on component manufacturing assemblies than on traditional machine industry. Buy us, a change in products--since universal equipment does not exist in this industrial branch--requires technological change and completely new machinery, the cost of which is impossible to cover from the development fund formed at the enterprise. The technical development fund is in itself a large sum, but in general cannot be used for the purchase of new assembly lines or for the financing of other investments necessary for the serial manufacture of developed new products. It would be good if some of the billions that are intended for the electronic program would be devoted to this.

Lajos Koveskuti, chairman, and Laszlo Koller, technical deputy chairman, of the Communications Cooperative: The electronic equipment and appliance manufacturers perform essentially assembly activity. Therefore, the technical level and price of the products they manufacture are determined decisively by the modernity of the components that are used. As compared to the technical level of developed industrial countries, our finished product manufacture is unfortunately lagging, with few exceptions. If we do not want the gap to widen, we need above all a modern microelectronic components supply.

There are two possible ways of meeting this demand: imports and domestic manufacture. If we import, particularly if we buy highly complex, integrated circuits abroad, then we can count in effect only on capitalist trade. At the same time, it is well known that the foreign currency situation of the Hungarian economy affords opportunity for such purchases only within certain limits. The other possibility is domestic production. But our component manufacture lags behind the technical level of developed countries even more than our finished product manufacture. We are lagging about 10 years behind. We are convinced that we cannot speak of a modern electronic industry if its most important branch, the manufacture of components, is undeveloped. Therefore, we were happy to see that the special electronic development program is ready, and thus primarily component manufacture will advance in a reassuring way. We the consumers of the renovating components industry expect that the components to be manufactured will be modern also by international comparison, and be available at acceptable price, in adequate volume and in proper time.

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LASER ASSISTED SEMICONDUCTOR PROCESSING SYSTEM

Budapest MUSZAKI ELET in Hungarian 15 May 81 p 4

[Text] We interviewed Dr Ivan Kertesz, senior member of the KFKI [Central Physics Research Institute] of the Hungarian Academy of Sciences, about the Nd-YAG laser-assisted, precision, material-processing, special-purpose machine. He stated: "After several years of research Hungary has concentrated on fabrication of CO_2 gas lasers and Nd-YAG solid state lasers. The Nd-YAG laser is the most efficient of the continuously operating solid state lasers.

"The Hungarian electronics industry required the KFKI to develop laser equipment capable of trimming thick and thin film, of etching semiconductor wafers and heat-treating semiconductor materials.

"First, with the aid of the National Technical Development Committee [OMFB], the KFKI set up a model laboratory equipped with lasers it had developed. This helped solve some industrial problems. A laser device having an average output of 50-100 W was fabricated; during repeated Q-switching, it provides a peak of 100-KW pulses. We found this performance range adequate for meeting requirements for the most diverse precision processing of material.

"Our experiments, conducted with the optical and positioning unit of the KFKI's system were highly successful, and we were able to reproduce the results of the most sophisticated foreign firms. Trimming was accomplished with an accuracy of a tenth of a percent and at a rate of several thousand resistor per hour, while the speed of etching exceeded 10 cm per second.

"In the course of implantation, during fabrication of semiconductors, faults occur in the crystal structure. Recently, heat treatment by lasers is being used to eliminate these. We have concerned ourselves to a great extent with modifying this operation, all the more so since sapphire dielectric substrate semiconductor devices are being more widely used. Since preparation of these is extremely costly, researchers have long been seeking ways of finding a substitute for them. Our institute proceeded to make an insulating layer on a silicon chip and depositing another semiconductor layer on this.

"We were able to solve the task, including the laser heat treatment required to achieve the desired crystal structure through our process which makes possible fabrication of the desired device with a far less costly technology. Together with researchers of the semiconductor division of the KFKI, we improved the process and ultimately patented a technique which produces devices similar to the previously described one but consisting of several layers.

"The special KFKI equipment depicted is easy to use: the multi 10μm chips can readily be observed by the operator on the TV monitor which has 100 X magnification."

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GALLIUM-BASED SEMICONDUCTORS IN MICROELECTRONICS

Budapest MUSZAKI ELET in Hungarian 15 May 81 p 4

[Excerpt] Internationally acclaimed Hungarian achievements in microwave and circuitry development were discussed by Dr Odon Lendvay, scientific main department head of the Technical Physics Research Institute [Muszaki Fizikai Kutato Intezet] of the Hungarian Academy of Sciences:

"There are many areas in microelectronics where silicon-based semiconductor devices cannot be used. There our activity was concentrated on gallium arsenide and its related compounds. Our country is among the few in which a significant amount of the rare metal gallium is formed as a byproduct of alumina production. For development of the elements or circuitry required for operation of microwaves, substances are needed in which the velocity of the charge carriers (electrons and holes) are suited to frequencies in the gigahertz range.

"Through basic research, our institute has already developed GaAs-based devices: Gunn and Schottky mixing and detector diodes for the communications industry. Our technology was patented and, according to tests conducted at TAKI [Tavkozlesi Kutato Intezet, Telecommunications Research Institute], Orion and FMV [Finommechanikai Vallalat, Precision Mechanics Enterprise] of Debrecen, the performance of these devices matches that of similar ones fabricated by major Western firms. They are to be put to industrial use during the Sixth 5-Year Plan. We have also dealt with types and combinations of these active elements which have been used successfully in traffic counting, in form recognition, control technology, geodesy, and security technology. At present, our researchers are working on continuing development of Gunn and Schottky diodes and broadening their field of use.

"Development of GaAs-based planar devices best represented by MESFET, high-frequency, metal-gate, field-effect transistors, is an important new project of foreign research and manufacturing firms. We, too, must solve many scientific problems before we can fabricate such devices.

"During fabrication of semiconductor devices, chemical and physical phenomena have a strong influence on their crystal structure and chemical makeup. Thus, exceptionally small factors can change semiconductor properties. Fashioning the metal contact seems like a simple operation, but the stochiometry of the GaAs crystal can break up locally under contact and, in the course of welding, a high-resistance submicronic layer forms instead of an ohmic contact of low resistance. Therefore, we investigated the circumstances under which such processes come into being and the possibilities of avoiding the harmful effects. Discovering the defect structure of the substance and its crystal structure are similarly important from the viewpoint of the characteristic parameters, operation reliability and life expectancy of the device. This is because basic physical processes occur during fabrication in the course of which crystal defects may originate, move, combine and change the electrical parameters. In fact, the device may become 'catastrophically' flawed. So far we have succeeded in recognizing numerous problems related to the occurence of the aforementioned defects and in working out several solutions of technological possibilities for avoiding them. In the course of this, we evolved new equipment and principles for making measurements. The 'deep niveau' spectrometer fabricated by the Institute last year is being purchased by friendly and capitalist institutes alike.

"In practice, the MESFET is also used in the microwave communications industry. A similar but far more complex planar device is the GaAs-based integrated circuit with high-speed logic which will be used soon in optical communications, following applications in military engineering. This technology requires single GaAs semiconductor crystals of special quality or crystal wafers. Since these are in short supply everywhere, our institute intends to set up a laboratory in which the starting materials for microelectronics research and development can be prepared. We have purchased a Soviet license for processing the material so that we can build up the necessary active layers on the substrate with its aid. We acquired the technological know-how for utilizing the license in advance.

Thus the new investment will enable us to make the starting material for the outlined research and development and subsequently begin limited series production of optical and microwave semiconductors in quantity and quality adequate for meeting domestic demand.

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EXPERIMENTS TO ACTIVATE LATENT HUMAN ADENOVIRUS INFECTION IN TISSUE CULTURES

Budapest KISERLETES ORVOSTUDOMANY in Hungarian Vol 33 No 2, Apr 81 pp 118-123
manuscript received 9 Jun 80

ONGRADI, Jozsef, KULCSAR, Gizella, DAN, Pal, HORVATH, Jozsef, NASZ, Istvan;
Semmelweis Medical University, Institute of Microbiology

[Abstract] The possibilities of activating a latent adenovirus infection were investigated in vitro. Using subliminal doses (0.5 TCD_{50}) of human adenovirus type 5, latent infections were produced in primary human amnion cell cultures and in HEp-2 tissue cultures. Viral doses producing barely noticeable cytopathogenic effect (10 TCD_{50}) were also used, and 100, 1000 and 2000 TCD_{50} doses were used as controls. The presence of latent infection was confirmed using indirect immunofluorescence. Activation of the infection was attempted using various hormones, chemical carcinogens and the "Pyrago" drug preparation (containing cells of killed bacteria and fungi) in amounts which do not cause damage to tissue cultures. The presence or absence of a cytopathogenic effect was registered by light microscopy and immunofluorescence. It was found that only Pyrago was capable of activating the latent adenovirus infection in either cultures. In response to Pyrago, the characteristic cytopathic effect developed and infectious virus was produced in titratable amounts. Prednisolone failed to activate a latent viral infection although it did enhance the rate of viral growth in cultures infected with minimal doses of the virus. The possible modes, pathomechanism and theoretical problems involved in the activation of latent viruses is discussed. The results indicate that viral infection could be activated, in response to other microbes or their products, in latent adenovirus carriers, in a manner analogous to the herpes viruses. References 46: 7 Hungarian, 2 Russian, 37 Western

2473
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EXPERIMENTAL INFECTION OF MICE WITH HUMAN ADENOVIRUS TYPE 1

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HORVATH, Jozsef, KULCSAR, Gizella, DAN, Pal, NASZ, Istvan, GECK, Peter, ONGRADI, Jozsef; Semmelweis Medical University, Institute of Microbiology

[Abstract] Forty young adult mice were infected intraperitoneally with human adenovirus type 1 to study the initial stages of adenovirus infection. The virus was grown on HEp-2 tissue culture. Control mice were treated with saline. Infection was followed by viremia. There was a considerable increase in the absolute lymphocyte count and weight of the spleen of the animals already within the first 24 hours, without clinical symptoms of disease. To study intrauterine viral infections, 7 pregnant rats were infected with the same virus between 17-19 days of their pregnancy. Immunofluorescence, electromicroscopy and reisolation were used in an unsuccessful attempt to find infectious virus in the spleen and genital tract of the mothers and in the spleen of the newborn. However, viral particles were found in the spleen of the newborn as late as 6 weeks after birth. The presence of viral antigens was also confirmed by immunofluorescence. Viruses were found in the spleen and ovaries of the infected mothers. Viral antibodies could not be demonstrated in the serum of progenies from either the infected or the control mothers. The results indicate that, in mice, the adenovirus can reach the fetus through the placenta and the intrauterine infection will produce virus carriers. References 25: 9 Hungarian, 1 Russian, 15 Western

2473
CSO: 2502/78

CONTRIBUTION TO COSMIC SPACE RESEARCH DESCRIBED

Bucharest INFORMATIA BUCURESTIULUI in Romanian 25 May 81 p 2

[Article by Roxana Costache: "A New and Remarkable Stage in the Romanian Contribution to Cosmic Space Research"]

[Excerpts] The flight of the "Soyuz 40" with a Romanian and Soviet crew has concluded successfully, opening a new chapter in the history of Romanian science and aeronautics. Engineer Nicolae Teodosie, secretary of the section for technical sciences of the Academy of the Socialist Republic of Romania said: "Romanian scientists have made considerable contributions in the field of space research, implementing special programs prepared under the direct coordination of the National Council for Science and Technology, which is headed by Elena Ceausescu. From the studies and observations made with equipment on the ground, they have expanded their activity, conceiving and constructing equipment and installations of great precision, directly integrated into the flight systems or experiments scheduled."

Specialists in the Central Institute for Physics have constructed Series-SGR magnetometers. The SGR-2 variety, placed on board the Intercosmos 20 satellite, permitted, in the world premiere, the simultaneous measuring, on board the two satellites, of the magnetic field generated by longitudinal currents. This is a notable achievement since it has made it possible to make a spatial characterization of the direction of these currents. The SEZ-10 apparatus, installed on the Intercosmos 17 satellite, is regarded as a remarkable technical achievement because of its ingenious technology conception and construction, the miniaturization of its components and the low consumption of energy; it is especially important that with this success, the proposal of Romanian researchers in collaboration with Soviet researchers to use the phenomenon of radiation in a space experiment has been confirmed in actual experience.

The Institute for Technological Research and Design in Telecommunications has studied problems connected with direct television by satellite. During teledetection investigations Romanian experts discovered the opportuneness of applying these data in agriculture, hydrology and geophysics. With the aid of satellite images, for example, the tectonics and regional structure of the Oas-Gutii-Tibles neogenic volcanic range and of the Fagaras Mountains were deciphered and the courses of the Arges, Siret, Olt, Ialomita and other rivers were studied.

The launching of our countryman Dumitru Prunariu on a space flight opened a new and important chapter. We are talking about his performance and about his participation as a member of the crew of the "Soyuz 40" spaceship and in the activity on board the "Salyut 6"-"Soyuz 4"-"Soyuz 40" orbital complex and, at the same time, the extension of the contribution of specialists in our country to space research for peaceful purposes, by the completion of original physiochemical, technological and biomedical experiments. On board the orbital complex there were tests of applications conceived in scientific experiments of major interest such as the "Astro" program for the identification of new forms of existence of nuclear materials, or the premiere "Capilar -1" program which confirmed the possibility of obtaining, in cosmic space, monocrystals with determined characteristics, by using the effect of capillary action under conditions of weightlessness. Also, the supplementing of knowledge of a biomedical nature continued with the "Miocard," "Reo" and "Immunity" experiments. The data, which were studied in the Center for Flight Direction, by the group of specialists of the National Institute of Physics and of the Academy of Medical Sciences, and by the members of the Romanian Commission for Space Activity, will serve as a basis for the working out of new applicative methods and, at the same time, for increasing the effectiveness of techniques in industry and medical therapeutics.

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COOPERATION IN SPACE RESEARCH PROJECTS REVIEWED

Bucharest VIATA STUDENTEASCA in Romanian 20 May 81 pp 1, 2

[Article by Mircea Magdin: "A Closer View of Space"]

[Text] For nearly one week, through the news which we are steadily receiving from the press, we have been witnesses to a space event of great significance and with many implications for Romania's science and technology: the space journey of Soyuz-40, with its joint Romanian-Russian crew. On this occasion, we have followed with understandable emotion the successfull activity of the first Romanian astronaut, the first Romanian citizen to reach extra-terrestrial space, Dumitru Prunariu. The launching, the behavior of the crew in flight, the complex operation involved in the joining of Soyuz-40 and the orbiting station Salyut-6/Soyuz T-4, and the scientific experiments that have been conducted, are already major milestones of the Romanian-Russian flight, a significant expression of the multilateral collaboration between our countries and peoples, and a practical implementation of the cooperation programs established between the two nations--the INTERCOSMOS program--which expresses the fruitful collaboration of socialist countries in the study and use of space for peaceful purposes.

In this context it becomes useful to show the highly valuable contributions of Romania's science and technology, and of its specialists, who have brought remarkable practical achievements to the INTERCOSMOS program, particularly in the application of space technology to land-based activities, as well as in the field of telecommunications; this activity has been pursued under the direct guidance of the National Council for Science and Technology, and the Romanian Commission for Space Activities.

At the beginning, the activity of Romanian specialists in the INTERCOSMOS program (adopted in 1967) consisted of observations of artificial earth satellites, and of scientific research conducted in land-based laboratories. This work later developed and expanded with the construction of instruments, devices, and equipment to be installed aboard artificial earth satellites and very high altitude geophysical rockets. In subsequent years, the number of scientific experiments carried out aboard satellites increased, with the use of such instruments as magnetometers, spectrometers, and cosmic radiation detectors. Also notable is the proposed research designed to provide a better understanding of the manner in which the earth interacts with the sun, of the solar environment, high altitude atmospheres, the magnetosphere, and so on. Efforts will continue in the application of space technologies to remote detection, meteorology, and telecommunications.

A systematic evaluation of Romania's scientific contribution to the basic guidelines of the INTERCOSMOS program will disclose, first of all, the contributions of our researchers to the field of space physics. In studying the physics of the earth's high altitude atmosphere, Romanian specialists have collaborated ever since 1972 to improve mass spectrometer instruments; their work has consisted of better calibration methods for these instruments, as well as of the fabrication of new types of quadrupole spectrometers intended for atomic and isotopic analysis of the major components of the earth's upper atmosphere. Space magnetometry studies (the study of magnetic fields) as part of a complex experiment (MAGIK)--to which Romanian specialists have made a significant contribution--propose to study the electromagnetic relationship between the magnetosphere and the ionosphere, through the intermediary of longitudinal currents. In the field of cosmic rays, Romanian specialists have participated actively in the study of high energy cosmic radiation; most of the research devices installed aboard the Intercosmos-6 satellite recovered on land, are being studied in Romania. In the field of space geodesics, Romanian specialists have conducted observations of artificial earth satellites within the programs Marea Coarda, Dynamica, and Atmosfera, obtaining important results in determining the direction of chords and coordinates of earth space, modelling the movements of artificial satellites under the influence of perturbing gravitational forces, and studying the structure and properties of the upper layers of the atmosphere. Romanian contributions can also be found in the analysis of lunar rocks.

Since 1967, Romanian specialists have participated in the study of adaptive reactions on the part of living organisms, to conditions encountered in space flights, such as: modification of the gravitational field, exogenous hyperthermia, lowered oxygen partial pressure, and so on. Regarding the utilization of satellites for space telecommunications, the Institute for Technical Research and Planning in Telecommunications, as well as specialists in higher education, have participated in the activity of the Permanent Work Group for Space Telecommunications, conducting studies and research in such areas as: direct satellite television, digital transmission by means of satellites, and so on. And finally, significant Romanian contributions are also found in the application of space technologies to meteorology and the remote detection of earth resources.

A number of important physico-chemical and technologic experiments are being carried out as part of the Romanian-Russian space mission, to which the Romanian researchers have brought a considerable amount of information. The purpose of the Astro experiment is to find and study incompletely ionized atoms, to examine the fragmentation (interaction) processes of heavy cosmic ions, to obtain charge and energy spectra for these ions, and to identify new forms of existence of nuclear matter. It is notable that the instrumentation for the experiment has been constructed at the Bucharest Institute of Physics, and represents a technologic performance of world caliber. The Capilar I experiment is being performed for the first time in the history of space studies, seeking the production in space, of single crystals of predetermined shapes, through the use of capillary effects. Another experiment is named Nanobalanta, and its goal is to obtain information about the stability of thin protective layers of silicon dioxide under the influence of the space environment. The complex experiment Biodoza is intended to measure the count and spectra of heavy nuclei in cosmic radiation, the integral dose of this radiation, the contribution of the earth's radiation belts to this dose, and the effect of these factors on man's activity in space.

An important category of research is formed by biomedical experiments. Miocard, for instance, studies the modifications that occur in the cardiovascular system during space flight. Through the use of balistographic methods, Balisto will make it possible to record the accelerations of the human body as determined by the dynamics of the cardiovascular system, and to evaluate cardiac functions at various moments of space flight. Another experiment is named Reo, and aims to investigate the changes in cerebral, central, and peripheral blood flows, that are produced by various stages of the space mission. The experiment Homeostazia is dedicated to the study of the renal function and of endocrino-metabolic processes in the Romanian astronaut. Also very interesting is the experiment Immunitatea, which proposes to study the influence of space flight conditions on some active biologic substances which determine the antiviral protection and antiviral immunity of astronauts. The Pneumatic experiment studies the reaction of the astronaut's organism during acute adaptation to weighlessness and to the deposition of blood in the legs, creating hemodynamic conditions similar to those of earth's gravitation. The Guler experiment is aimed at the study of the influence of space flight on the interaction of analyzers and on the evolution of motion sickness during space flight, with special attention given to the role of vestibular and selfperception vision analyzers. The purpose of the experiment named Neptun is to study visual acuity and eventual changes in depth perception during space flight, while Ancheta is aimed at the symptomatology of vestibular disturbances in flight. This is an extremely heavy schedule for the Romanian-Russian space mission, and for the Romanian astronaut, with remarkable practical contributions to the progress of modern space flight and scientific knowledge.

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